CompSci 4
Chap 5 Sec 1
Oct 7, 2008

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Announcements

• Read Chapter 5 Sec 2 for next class
• New groups today
• Assignment 5 out
  – Part 1 and Part 2 Due Oct. 21
• Today
  – Interactive programming
  – Create billboards
Control of Flow

• Control of flow – how the sequence of actions in a program is controlled
  – What action happens first, second, third, ....

• In movie-style programs (Chaps 1-4) the sequence of actions is determined by the programmer
  – Creating a storyboard design
  – Writing program methods to carry out the designed sequence
Interactive Animations

• In interactive programs, the sequence of actions is determined at runtime, when the user provides **input**
  – Clicks the mouse
  – Presses a key on the keyboard

• Other sources of input are possible
Interactive Games

• In a video game where the user is guiding a spaceship, the sequence of actions …
  – Depends on what direction the user guides the ship
  – How fast the user presses the controls
• Each time the program runs, user input may cause a different sequence of actions
• Control of flow is “in the hands of the user”
Event Handlers

• An event may
  – Trigger a response, or
  – Move objects into positions that create some condition (e.g. a collision) that triggers a response

• An event handler is a method that is called to carry out the response.

• When an event is linked to an event handler, a behavior is created.
How does this effect your program?

• Our goal is to write interactive programs.
• The approach is the same as before, but the difference is now must be concerned with behaviors.
  – input from the user (events)
  – How objects respond to an event (event handler methods)
Example

• Build an air show flight simulator. The pilot (user) uses the biplane controls to perform acrobatic stunts.

• Problem: How do we write program code to provide a guidance system that allows the user to be the pilot?
Solution

• Use keyboard input
  – “F” key to move the biplane forward
  – Spacebar to make the biplane do a barrel roll
  – Note: other keys could be chosen

• Write event handler methods that respond to each key press

• Storyboards (next slide) and DEMO building world
Storyboards

• Since two keys are used, two events are possible – so two storyboard scenes

Event: Spacebar press
Response:
Do together
  roll biplane a full revolution
  play biplane engine sound

Event: F-key press
Response:
Do together
  move biplane forward
  play biplane engine sound

• Each storyboard outlines an event handler
  – Responds to a particular event
• Do not modify the length of the sound
  – use “as is”

• Coordinate duration of *move* and *play sound*
  – Match duration of move to duration of sound
Events Editor - Linking

• Each event handler method must be linked to an event

1) Select “create new event” Then choose the type of event

2) A template linking is created
Events Editor – Linking (cont)

3) Select type of key for event  
4) Select event handler method

Final result:
More Functionality

- **When** `F` is typed, do `biplane.flyForward`
- **When** `Space` is typed, do `biplane.barrel`
- **When** `↑` is typed, do `biplane.flyDirection direction = up`
- **When** `↓` is typed, do `biplane.flyDirection direction = down`
- **When** `←` is typed, do `biplane.flyDirection direction = left`
- **When** `→` is typed, do `biplane.flyDirection direction = right`
Add a Billboard with Instructions

- Add an event “I” to make the instructions hide or show

Key

- F: Forward
- Space: Barrel Roll
- ↑: Move Up
- ↓: Move Down
- →: Move Right
- ←: Move Left
- I: Show Instructions
- I: Hide Instructions
Classwork today

• Create 4 buttons and a spider robot
• Press green button and spider moves forward
• Press red button and spider moves backward
• Other two buttons?
• Create Billboard for instructions
• Create Method and Event for showing instructions